

Consolidated Water Use Efficiency 2002 PSP

Proposal Part One:

A. Project Information Form

1. Applying for (select one): ☐ (a) Prop 13 Urban Water Conservation Capital Outlay Grant
☒ (b) Prop 13 Agricultural Water Conservation Capital Outlay Feasibility Study Grant
☐ (c) DWR Water Use Efficiency Project
2. Principal applicant (Organization or affiliation): Tulelake Irrigation District
3. Project Title: Evaluation of the Feasibility and Cost Effectiveness of Canal Lining
4. Person authorized to sign and submit proposal:
- | | |
|-----------------|---------------------------------|
| Name, title | <u>Earl Danosky, Gen. Mgr.</u> |
| Mailing address | <u>PO Box 299, Tulelake, CA</u> |
| Telephone | <u>96134</u> |
| Fax. | <u>(530) 667-2249</u> |
| E-mail | <u>(530) 667-4228</u> |
| | <u>tid@cot.net</u> |
5. Contact person (if different):
- | | |
|------------------|-------------------------------------|
| Name, title. | <u>Margaret Bowker, President</u> |
| Mailing address. | <u>3785 Baker Lane, #201, Reno,</u> |
| Telephone | <u>NV 89509</u> |
| | <u>(775) 689-8630</u> |
| | <u>(775) 689-8614</u> |
| E-mail | <u>pbowker@</u> |
| | <u>nimbusengineers.com</u> |
6. Funds requested (dollar amount): \$ 99,720
7. Applicant funds pledged (dollar amount): \$ 20,000
8. Total project costs (dollar amount): \$ 119,720
9. Estimated total quantifiable project benefits (dollar amount): N/A
- Percentage of benefit to be accrued by applicant: N/A
- Percentage of benefit to be accrued by CALFED or others: N/A

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Proposal Part One:

A. Project Information Form (continued)

10. Estimated annual amount of water to be saved (acre-feet): 20,000
- Estimated total amount of water to be saved (acre-feet): 200,000
- Over years 10
- Estimated benefits to be realized in terms of water quality, instream flow, other: Increased instream flow below diversion
11. Duration of project (month/year to month/year): Oct 2002 to Dec 2003
12. State Assembly District where the project is to be conducted: District 2 - Richard Dickerson
13. State Senate District where the project is to be conducted: District 1 - Thomas Aller
14. Congressional district(s) where the project is to be conducted: District 2 - Wally Herger
15. County where the project is to be conducted: Modoc/Siskiyou
16. Date most recent Urban Water Management Plan submitted to the Department of Water Resources: N/A
17. Type of applicant (select one):
- Prop 13 Urban Grants and Prop 13 Agricultural Feasibility Study Grants:
- ☐ (a) city
- ☐ (b) county
- ☐ (c) city and county
- ☐ (d) joint power authority
- ☒ (e) other political subdivision of the State, including public water district
- ☐ (f) incorporated mutual water company
- DWR WUE Projects: the above entities (a) through (f) or:
- ☐ (g) investor-owned utility
- ☐ (h) non-profit organization
- ☐ (i) tribe
- ☐ (j) university
- ☐ (k) state agency
- ☒ (l) federal agency
18. Project focus:
- ☒ (a) agricultural
- ☐ (b) urban

Consolidated Water Use Efficiency 2002 PSP

Proposal Part One:

A. Project Information Form (continued)

19. Project type (select one):
Prop 13 Urban Grant or Prop 13
Agricultural Feasibility Study Grant
capital outlay project related to:

- ☐ (a) implementation of Urban Best Management Practices
- ☒ (b) implementation of Agricultural Efficient Water Management Practices
- ☐ (c) implementation of Quantifiable Objectives (include QO number(s))

☐ (d) other (specify)

DWR WUE Project related to:

- ☐ (e) implementation of Urban Best Management Practices
- ☐ (f) implementation of Agricultural Efficient Water Management Practices
- ☐ (g) implementation of Quantifiable Objectives (include QO number(s))
- ☐ (h) innovative projects (initial investigation of new technologies, methodologies, approaches, or institutional frameworks)
- ☐ (i) research or pilot projects
- ☐ (j) education or public information programs
- ☐ (k) other (specify)
-

20. Do the actions in this proposal involve physical changes in land use, or potential future changes in land use?

- ☐ (a) yes
- ☒ (b) no

If yes, the applicant must complete the CALFED PSP Land Use Checklist found at http://calfed.water.ca.gov/environmental_docs.html and submit it with the proposal.

**Consolidated Water Use Efficiency 2002 PSP
Proposal Part One
B. Signature Page**

By signing below, the official declares the following:

The truthfulness of all representations in the proposal;

The Individual signing the form is authorized to submit the proposal on behalf of the applicant; and

The individual signing the form read and understood the conflict of interest and confidentiality section and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant.

<u>Carl C. Sanosky</u>	<u>MANAGER</u>	<u>FEB 28, 02</u>
Signature	Name and title	Date

Proposal Part Two

Project Summary

Efficient use of irrigation water provided by the US Bureau of Reclamation Klamath Project is vital to the economic viability of the Tulelake area. The Tulelake Irrigation Districts (TID s or the District s) objective is to deliver Klamath Project Water more efficiently by significantly improving water management. The goal of this project is to evaluate the feasibility and cost effectiveness of canal lining and the use of automated control devices. The project will install ten automated flow measurement and control devices at locations along lined and unlined portions of the distribution canal system operated by TID in the portions of Siskiyou and Modoc Counties surrounding the community of Tulelake (Figure 1).

The automated flow measurement and control network will provide data from unlined and lined canals. Four miles of the District s 242 miles of distribution canals are lined. Comparison of measured flows will provide water loss data from unlined and lined canals and will be used to identify significant unaccounted-for water system losses and quantify potential water savings achieved as a result of canal lining and automated flow control. This data will be used to evaluate the feasibility and cost effectiveness of canal lining and the installation of automated flow control devices.

Automated flow measurement stations and control devices will benefit TID by providing the District with the ability to continually monitor and control canal flows to better match system demands, resulting in more efficient and flexible delivery of water including a reduction of canal spills. The District s customers will benefit from improved reliability and flexibility of irrigation deliveries. Additionally, this project will potentially reduce diversion from the Lost and Klamath Rivers to improve instream flow conditions and provide long-term diversion flexibility to increase water supply for beneficial uses.

This project will implement or evaluate the following efficient agricultural water management practices: line or pipe ditches and canals; increase flexibility in water ordering by, and delivery to, the water users within operational limits; and automate canal structures. Lining of limited sections of the distribution system could result in water savings of up to 20,000 acre-feet annually (AFA). The data from this project will provide the basis for estimating actual water savings from canal lining and other water use efficiency projects. The cost of the project is \$119,720, of which TID is contributing \$20,000 as in-kind cost sharing.

Section A

Scope of Work: Relevance and Importance

This section describes the nature, scope, and objectives of the project and explains its need in the context of local, regional, State, and Federal water issues.

A1. NATURE, SCOPE, AND OBJECTIVES

Evaluation of the feasibility and cost effectiveness of canal lining requires flow monitoring data to quantify water losses in both lined and unlined portions of TID's distribution system. This project will provide some of the infrastructure to allow TID to continually monitor and control canal flow by the use of automated flow measurement and control devices. This project will result in increased reliability and flexibility of irrigation deliveries and reduce Lost River and Klamath River diversions by ensuring that diverted water is used efficiently.

This proposal identifies the necessary site selection, design, installation, and monitoring to assess the feasibility of installing additional automated flow control devices and lining portions of the District's distribution system. The objective of this project is to significantly increase the District's water delivery efficiency by improved water management. This project will result in an evaluation of the feasibility and cost effectiveness of installing automated flow control devices and lining canals serving the District. Fundamental to water management plans is the ability to measure water use and quantify the success of these and other conservation programs.

This project will provide for components of an automated flow measurement and control network, which will be used to generate the data necessary to evaluate the feasibility and cost effectiveness of additional canal lining. The project will also evaluate the feasibility and cost effectiveness of the installation of automated control. The District's customers will benefit with improved reliability and flexibility of irrigation deliveries. Increased instream flows resulting from more efficient water delivery by the District will benefit downstream users and the environment.

The scope of the project consists of the following tasks.

1. Site selection for flow measurement and control devices
2. Environmental documentation-CEQA
3. Prepare bid and contract documents
4. Competitive bid
5. Install flow measurement and control devices
6. Set up monitoring network
7. Collect flow measurement data
8. Evaluate feasibility and cost effectiveness of canal lining
9. Prepare project report

A2. WATER ISSUES

The efficient use of California's limited water supplies is a critical local, regional, statewide, and national issue. The District utilizes surface water diverted from the Lost River and Klamath River by the US Bureau of Reclamation Klamath Project. Klamath Project water delivery was curtailed during the 2001 irrigation season to ensure lake levels and instream flows as required by the Endangered Species Act (ESA). The lack of irrigation water resulted in tremendous financial losses by the customers of TID and the Tulelake area.

The curtailment of water delivery required by the ESA is a highly controversial State and Federal issue that will have long-lasting ramifications. Klamath Project water deliveries may be curtailed again for the 2002 irrigation season and in future years until this controversy is resolved. Klamath Project water supplied to the District must be delivered and used as efficiently as possible.

The District diverts 130,000 AFA of water at the Anderson Rose Dam on the Lost River. The District provides 260,000 AFA of water to irrigate 63,000 acres in northern Siskiyou and Modoc Counties as part of the Klamath Project. The additional water is available due to recovery of tail waters from the system.

TID's distribution system includes 242 miles of canal, about 4 miles of which is lined in two areas of significant seepage. Approximately 2 miles of the J Canal and 2 miles of the M Canal are lined in the vicinity of Newell. Lining of these portions of the canals has resulted in a significant reduction of water losses due to seepage. The District has automated 42 flow control structures. Most of the control structures have downstream control, others have upstream control, and sixteen can be monitored and operated from the District's office. None of the automated control devices are installed in lined portions of the canals. The use of these automated control devices has improved water delivery and reduced operation spills.

Canal lining and automated flow controls are widely accepted methods to reduce irrecoverable water losses. However, TID has been unable to quantify the water savings resulting from these water conservation measures due to the lack of flow measurement devices. The District must have the ability to measure water use throughout its primary distribution system in order to quantify the success of conservation programs. This proposal provides an initiative to do so. Flow measurement capability and automation will result in better water supply management and the ability to quantify the resulting water savings.

The Agricultural Water Management Council has identified efficient water management practices (EWMPs). Three conditionally applicable EWMP will be implemented or evaluated as the result of this project: number 5 *Line or pipe ditches and canals*; number 6 *Increase flexibility in water ordering by, and delivery to, the water users within operational limits*; and number 9 *Automate*

canal structures

Increased water delivery efficiency by TID through improved water management is necessary to maximize the beneficial use of Klamath Project water and provide for the economic viability of the Tulelake area. Improved water delivery efficiency reduces diversion, resulting in additional Klamath Project water for the environment and downstream beneficial use.

Section B

Scope of Work: Technical/Scientific Merit, Feasibility, Monitoring and Assessment

This sections discusses the merits and feasibility of the scope of work.

B1. METHODS, PROCEDURES, AND FACILITIES

This project consists of the following elements:

- Identify appropriate sites for the installation of automated flow measurement and control devices in lined and unlined portions of the Districts distribution system.
- Retrofit ten gated concrete structures with flow measurement and control devices.
- Integrate these devices with supervisory control and data acquisition facilities to automate flow measurement and control.
- Collect and evaluate flow measurement data.
- Evaluate feasibility and cost effectiveness of installing additional automated control structures and lining portions of the distribution system.

Measurement devices and supervisory control and data acquisition facilities will be installed at ten existing control structures to measure flow. The supervisory control and data acquisition information will consist of water level readings at each structure, equipment status, and flows tied to rating curves for the measurement structures. Supervisory control and data acquisition telemetry will be installed to relay the data to the District offices.

The District will use standard purchasing and contracting procedures to purchase project materials. TID proposes that they install the flow measurement and automated flow control devices as an in-kind cost-sharing service. TID staff will perform the installations with the aid of manufacturer s representatives using standard engineering and construction methods. Additionally, the District will perform the operation and maintenance of all new facilities and equipment.

Canal seepage is significant in certain sections where fast draining soils allow the canal to contribute directly to the underlying groundwater basin. The District implemented a canal lining program with the continuous lining of 2.3 miles of the M Canal near Newell (see Figure 2). Approximately 1.7 miles of the J Canal near Newell was lined in intermittant segments prior to 1956 by the US Bureau of Reclamation. The District has also implemented a program to automate control structures. To date, 42 automated control structures have been installed.

Installing flow measuring devices in conjunction with these facilities will allow collection of the data necessary to quantitatively assess potential water savings due to the installation of control structures and lining of canal.

TID will monitor and assess water use following the installation of the flow monitoring and control devices in the lined and unlined portions of the distribution system. Comparison of the flow data from the lined and unlined portions of the canals and from those portions with automated control structures will be used to determine the feasibility and cost effectiveness of additional canal lining. Additionally, the feasibility and cost effectiveness of the installation of additional control structures will be evaluated. The information will be made available to the public through various outreach methods.

B2. TASK LIST AND SCHEDULE

A bar chart schedule is presented in Table B-1.

Task	Costs	2002			2003											
		10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
1. Site Selection	\$4,720	■														
2. Environmental Documentation	\$3,230		■	■												
3. Finalize Contract Documents	\$7,400		■													
4. Competative Bid	\$2,920			■												
5. Install Devices	\$67,480				■	■	■	■	■							
6. Setup Network	\$6,770							■	■							
7. Collect Data	\$9,200								■	■	■	■	■	■		
8. Evaluate Feasibility	\$10,600														■	
9. Prepare Report	\$7,400															■

Table B-1. Project Time Line

Section C

Qualifications of the Applicants and Cooperators

C1. RESUME OF PROJECT MANAGERS

Resumes of Earl Danosky, TID Project Manager, and Margaret Bowker, Nimbus Engineers Project Manager, are included in Appendix I.

C2. EXTERNAL COOPERATORS

No external cooperators will be utilized for the Tulalake Irrigation District's evaluation of the feasibility and cost effectiveness of canal lining.

Section D

Benefits and Costs

This section describes the costs and benefits associated with the project. Included is a detailed budget breakdown. An assessment of the costs and benefits of the proposed project is provided.

D1. BUDGET BREAKDOWN AND JUSTIFICATION

Table 1 in Appendix II shows cost by task for TID labor and expenses, consultants, and materials. The costs for this project are composed primarily of labor time for District staff and consultant staff as needed to support the technical analysis and the purchase of instrumentation.

The total cost of the project is \$119,720. This proposal requests \$99,720 of funding.

D2. COST-SHARING

The District will provide the manpower and equipment to retrofit existing structures and to install new instruments as in-kind cost sharing. These costs are estimated to be \$20,000. Long-term operation and maintenance of the instruments will be provided by TID.

D3. POTENTIAL BENEFITS TO BE REALIZED AND INFORMATION TO BE GAINED

The primary purpose of this project is to gather information to determine the feasibility and cost effectiveness of lining canals in TID's jurisdiction. In order to do this, automated flow monitoring equipment will be installed, monitored and maintained. The data collected will assist in quantifying canal losses and determining which canal sections would most benefit from canal lining. In addition, selected existing structures would be upgraded and made more efficient or replaced.

This project will provide the data for constructing and operating a more efficient irrigation system, benefitting the agricultural industry. It also will provide more water for other uses, such as maintaining wildlife habitat, thereby benefitting the recreation/tourism industry and the environment. This project has strong potential to increase overall water use efficiency within the TID service area by up to 15 to 20 percent, resulting in up to 20,000 AFA less of diversion freeing additional instream flows that can be allocated for other beneficial uses.

D4. BENEFIT REALIZED AND INFORMATION GAINED VERSUS COSTS

The ultimate benefit of the project will be a more efficient irrigation system with less water lost. It is estimated that 20,000 AFA are lost from TID canals. This represents approximately 15 percent of the water diverted from the Lost and Klamath Rivers annually. Potential water savings resulting from increased water delivery reliability and flexibility have not been quantified, but could be up to 5,000 AFA.

The US Bureau of Reclamation purchased groundwater for \$30 per acre foot to supplement curtailed surface water diversions during the 2001 irrigation season. At \$30 per acre foot of water, improved efficiency from canal lining could result in savings of up to \$600,000 per year.

By identifying canal sections that would most benefit from lining, the cost/benefit ratio would be greatly improved. The District incurred costs of approximately \$100,000 per mile during their 2001 canal lining project. These costs will be used to evaluate the feasibility and cost effectiveness of canal lining.

Other benefits, such as improved delivery efficiency and increased instream flows have not been quantified.

Section E

Outreach, Community Involvement and Acceptance

The proposed project will provide the District with the capability to more flexibly and efficiently manage the amount and timing of diversions and the data necessary to evaluate the feasibility of canal lining and the use of automated flow control devices. Reduction of diversions will increase instream flows and reduce operational spill losses. The District will inform area growers and other interested parties of the project, its goals, status, and results via its public meetings.

Board members of the District are active in a variety of local, State, and Federal groups involved in water issues, including:

- Hatfield Working Group which consists of local, State, Federal, and tribal stakeholders working to resolve water-related issues in the Klamath Basin;
- Board of the Nature Conservancy focusing on water issues at all levels;
- Klamath Basin Water Users which consists of stakeholders from Klamath Project irrigation districts providing recommendations to the US Bureau of Reclamation;
- Working Group of the Tule Lake National Wildlife Refuge addressing integrated land management of the Refuge; and
- Local Resource Conservation District.

The District also works closely with the California Waterfowl Association and Ducks Unlimited to ensure water availability to maintain habitat at the Tule Lake National Wildlife Refuge and surrounding private lands. The diverse involvement in a variety of groups by the District's Board gives them a regional perspective of the issues facing the District and provides ample opportunities to disseminate the information gained by this project.

This project does not directly provide employment or capacity building. It does support the objective of more efficient management of agricultural water supplies, potentially making more water available for beneficial uses. The Tulalake area typically has a higher unemployment rate and lower average per capita income and median family income than the rest of the State. The major employer is agriculture and a more reliable, better managed water supply will help improve the region's economy by accommodating growth in industry and agriculture, including growth in employment opportunities in all economic sectors.

The intent of the project is to improve water management capabilities and water delivery efficiency resulting in decreased diversions and increased instream flows. Information compiled during this project will be disseminated to area growers, neighboring water users, the Bureau of Reclamation, and the Department of Water Resources. This information will include the potential benefits of canal lining and use of automated control structures.

Appendix I

Resumes

Earl Danosky

General Manager

Education Bachelor of Technology: Mechanical Engineering, Oregon Institute of Technology, 1972
Associate Degree: Mechanical Engineering, Oregon Institute of Technology, 1971
Associate Degree: Drafting and Design, Oregon Institute of Technology, 1971

Experience Mr. Danosky has served as the General Manager of the Tulelake Irrigation District since 1979. Mr. Danosky has worked his way up from Ditchrider, to Irrigation Specialist, and Operations Superintendent to General Manager. His experience has given him a full understanding of all operations and issues regarding the Tulelake Irrigation District.

Related

Experience Vice-President of Klamath Basin Water Users Association, a group of irrigation district representatives who provide recommendations to the Bureau of Reclamation regarding the Klamath Project.

Member of working group to address integrated land management of the Tulelake National Wildlife Refuge.

Margaret F. Bowker, P.E.
President

Education B.S., 1978, Civil Engineering, University of Nevada, Reno
Continuing Education in HEC-1, HEC-2, Erosion and Sedimentation

Registration Professional Engineer, Civil, NV 5252
Professional Engineer, Civil, AZ 14256

Experience Ms. Bowker has a broad background in the field of civil engineering; she has served as Principal in Charge and Project Manager for numerous projects overseeing budgets, timetables and project scheduling as well as concept development, technical review, principal investigator and expert witness. She is a recognized expert in the field of surface water hydrology and hydraulics, flood control design and storm drainage for arid and semi-arid climates. Ms. Bowker is committed to working toward development of sound public policy on all types of water issues. She has participated on a number of advisory committees and technical councils, including Washoe County's initial Water Planning Commission, FEMA's Technical Mapping Advisory Council and the National Research Council's committee on Alluvial Fan Flooding.

Her experience includes management of a wide variety of projects including channel design and storm drain design, hydrologic studies, hydraulic analyses and other civil engineering projects which include design for airports, roadways and subdivisions.

Relevant Projects **Drainage and Flood Control Master Plan, Southeast Truckee Meadows Specific Plan, Washoe County, Nevada** - Principal-in-Charge/Project Manager for hydrologic and hydraulic analyses and preliminary design to develop a Master Plan for a large agricultural area being converted to a planned residential and commercial development. The project is traversed by two major Truckee River tributaries, Whites and Steamboat Creeks. Project involved preliminary channel designs, major hydraulic structures for roadways and an overall concept for preserving wetlands and riparian areas and mitigating impacts of the development. A HEC-1 hydrologic model was developed to calculate existing and proposed storm runoff. A 5000 cfs diversion structure in Steamboat Creek was included in the project so that existing drainage pattern will be preserved once development begins. The 5000 cfs diversion will maintain flows through existing and created wetlands in the plan, as well as two regional detention basins designed to reduce the proposed flows to the existing flow condition.

Flood Insurance Studies, Various Counties and Cities, Nevada

Principal in Charge and Project Manager for six major FEMA studies for Nevada communities. These studies include development of hydrologic and hydraulic models for delineation of floodplain boundaries to assist the local agencies in floodplain regulation and to develop rates for flood insurance. These studies involved hydrologic evaluation of large rivers using gage data and frequency analysis, and evaluation of smaller streams using HEC-1 modeling techniques.

Whites Creek Branch Four Channel, Galena Meadows Subdivision, Washoe County

Principal in Charge and Project Manager for development of a channel to convey supercritical flows of Whites Creek Branch 4. Channel design involved extensive riprap design and the relocation of an irrigation channel.

Technical Advisor for the Truckee River Water Management Council, Reno, Nevada - Nimbus Engineers and Ms. Bowker, in particular, were retained by a group of landowners and property managers in the area of the Truckee Meadows which was most severely impacted by the January 1997 floods. The group was seeking was to protect themselves and the entire community from future flood damages. Projects undertaken on behalf of the Council were a mapping and quantification of flood damage in the area and the development of information to support a financial analysis of the flood s impact. A HEC-2 Model of the flood was developed and is currently being incorporated into a UNET model. Ms. Bowker also was responsible for the Council s presentation of a flood proofing workshop for local public and private interests. As the Council s Technical Advisor, Ms. Bowker has organized and attended public and agency meetings to assist the communities efforts in flood recovery. The Council is currently monitoring ongoing efforts to develop a flood control project and a flood warning system.

I-80/Pyramid Way Interchange Project, Nevada Department of Transportation, Sparks, Nevada - Principal-in-Charge for the drainage design and utility mapping and relocation for the interchange project. The project includes the hydrologic development, hydraulic analysis of existing and proposed facilities, final design and preparation of plan and profiles of the storm drain system for the interchange. One of the parameters for the project was the design of two detention basins to insure that the runoff in the proposed condition did not exceed that of the existing condition.

Appendix II

Budget

Task	TID		TID Expenses	Consultants	Materials	Total Project Dollars
	Labor					
1. Site Selection	\$1,000			\$3,720		\$4,720
2. Environmental Documentation	\$1,000			\$2,230		\$3,230
3. Finalize Contract Documents	\$1,000			\$6,400		\$7,400
4. Competitive Bid	\$1,000			\$1,920		\$2,920
5. Install Devices ¹	\$20,000		\$5,000	\$7,480	\$35,000	\$67,480
6. Setup Network	\$3,000			\$3,770		\$6,770
7. Collect Data	\$6,000			\$3,200		\$9,200
8. Evaluate Feasibility	\$1,000			\$9,600		\$10,600
9. Prepare Report	\$1,000			\$6,400		\$7,400
Total Project Costs	\$35,000		\$5,000	\$44,720	\$35,000	\$119,720

¹ TID labor costs are in-kind cost sharing

Table 1. Cost Estimate